Leviathan Mine: 2015/2016 El Nino Contingency Plan

1. Background

The Leviathan Mine located in Alpine County, California, in the Sierra Nevada Mountain Range, is a former open pit mine that includes approximately 250 acres of disturbed area, a 50-acre open pit, and associated waste rock piles. The mine site is located at 7,000 feet above mean sea level in the Sierra Nevada mountain range in California near the Nevada state line, 25 miles southeast of Lake Tahoe in the Carson River watershed. Acidic mine drainage from the mine site discharges into Leviathan Creek. Leviathan Creek merges with Mountaineer Creek approximately 2.5 miles downstream from the mine and forms Bryant Creek. Bryant Creek flows through US Forest Service land, pine nut allotments, and private ranch land in Nevada, and eventually flows into the East Fork Carson River. Native sulfur was extracted from Leviathan Mine by underground and open-pit mining methods, which ceased in 1962 (Regional Board 1975). Groundwater flows through the mine site and becomes impaired as water contacts sulfide- and metals-bearing rock. Unless all water is captured and treated, some acidic, metals-bearing seepage discharges to the creek from known sources. Additional unidentified sources of contaminants may also impair surface water quality. The mine waste and water contact have been reduced through remediation activities. There are three treatment systems operating at the mine, to capture five known discharges of acid drainage.

Event Scenarios

A. El Nino High Rainfall Release

El Nino during winter creates conditions under which high precipitation (rain and/or snow) storms are more likely in the Sierra Nevada Range in California. Two scenarios have been identified in which El Nino rainfalls during the 2015/2016 winter season could negatively impact the site.

1.) Acid Drainage Storage Ponds Filled to Capacity

Excessive rainfall, coupled with higher rates of acidic drainage entering the Leviathan Acid Drainage Storage Ponds could lead to release of acid drainage via overflow control structures. Higher than expected water levels in the ponds could trigger the need for emergency spring treatment using equipment similar to what was last deployed in spring 2011.

2.) Beaver Dam Failure

Additionally, another event identified as a having a potential to occur is the failure of beaver pond dams located downstream from the mine site along Leviathan Creek in the Beaver Dam/ Pond Complex (PD/PC) area. It is assumed that the water quality conditions in the beaver ponds during winter would be relatively good (i.e. circa-neutral pH, relatively low metals concentration, etc.) due to high volume and flow, and would not create a water quality concern. Of greater concern, is that the beaver ponds are located upstream of a culvert that crosses under the primary access route to the mine site (Leviathan Mine Road). Under high El Nino rainfall conditions, if debris were mobilized

from a dam failure it could potentially obstruct the culvert and potentially cause the stream crossing to be overtopped and damaged by erosion. This could inhibit access to the site, and potentially lead to a delay in performing seasonal water treatment activities in the spring. This could compound the problem of Scenario A: Higher than expected water levels in the ponds could trigger the need for access to the site for emergency spring treatment.

2. Pre-event Monitoring and Communications

This section is divided based on the two separate scenarios described above.

A. Acid Drainage Storage Ponds Filled to Capacity

Direct precipitation and acidic drainage from the Adit and Pit Underdrain (PUD) accumulate in four storage ponds at the site. The acidic drainage flows by gravity into three upper ponds (Ponds 1, 2N and 2S). The same water surface elevation is maintained in each of the three upper ponds via a system of buried pipes and valves. Each of the upper ponds is equipped with a standpipe outlet. When the water surface elevation in the three upper ponds reaches pond capacity, water flows into the standpipe outlets. From the standpipe outlets, the water is diverted via a system of underground pipes to the lower Pond 3. This pond is similarly equipped with a standpipe outlet that diverts flow to Leviathan Creek. During average precipitation (snow and rain) water years, the pond capacity is sufficient to contain the flows in the ponds until seasonal treatment occurs (usually during July). During above average precipitation, water volumes could potentially increase to the point where overflow of the ponds into the adjacent Leviathan Creek is a possibility in the late winter/early spring. The ponds were designed specifically to overflow in a controlled manner via the standpipe outlets and underground piping if pond capacity were to be exceeded.As in prior high-flow years, emergency measures would likely be taken to prevent discharges of untreated acid drainage to Leviathan Creek.

The California Regional Water Quality Control Board—Lahontan Region (Water Board) funds a pond level monitoring system that is maintained throughout the year by the United States Geological Survey (USGS). The pond level monitoring system reports to a website (http://waterdata.usgs.gov/nwis/uv?site_no=103087853) that allows remote monitoring of pond water level throughout the year. Each winter, as spring approaches Water Board staff, EPA staff, and contractor staff monitor the pond water level daily, and prepare projections of the time remaining until the ponds might discharge to Leviathan Creek. During storm events, staff monitor the on-line USGS station numerous times throughout the day and continually update internal Water Board projections on remaining pond capacity. In addition to this remote monitoring, Water Board staff will escort USGS personnel to the site at least every 6 weeks to manually confirm data logger measurements. Conditions of the site and at the culvert will documented and photographed, instrument readings will be noted, and a report provided to EPA within 48 hours after each site visit. Should debris be observed at the culvert, EPA would be

notified.

B. Beaver Pond Dam Failure

The potential event of a beaver dam failure and resulting discharge would likely not negatively affect downstream water quality since the impounded water is expected to be of relatively high quality during high flow conditions. The risk associated with a beaver dam failure is possible road damage from a large release of water and culvert blockage.

U.S. EPA operates monitoring equipment at Station-15 (at the site) and Station 25 (about 2 miles downstream from the site). Data are accessed remotely via web link (https://stormcentral.waterlog.com/public/usepar9) and monitored by U.S. EPA personnel on a weekly basis for significant short-term changes in flow and water quality. Short-term changes at Station-15 that would be considered possible evidence for failure of a beaver dam would consist of sudden increase in stream flow of an order of magnitude (10x), a decrease in pH of more than 0.5 standard units below the minimum value observed the previous day, or an increase in specific conductance of more than 15 percent of the measured value over a period of 2 hours. Exceeding any of these thresholds would result in immediate evaluation of additional monitoring data, evaluation of recent weather patterns and site observations, comparison with historical monitoring data, and determination of the need for response or need for a site visit.

Modifications to these notification thresholds may change dependent on observed fluctuations in flow and pH measurements throughout the winter season. This contingency plan may be updated accordingly.

Note that it is likely that the water in the beaver ponds area in the late winter and spring during high flows events would be of circa-neutral pH, and thus pH changes may not be noticeable or a good indicator of the status of the beaver pond areas during large runoff events. For this reason, specific conductance will also be used as a reliable indicator of water quality under high flow conditions

Atlantic Richfield - Throughout the 2015/2016 winter season, Atlantic Richfield will plan and attempt to visit the site one time per month to perform sampling and maintenance of the Aspen Seep bioreactor, dependent on safe access conditions, favorable weather conditions (existing and forecast), and subcontractor availability. However, Safe access and favorable weather conditions are necessary and will be determined by Atlantic Richfield in accordance with the Winter Access and Operations Plan and HSSE Program Document. As part of each winter season site visit (approximately monthly), Atlantic Richfield will observe the condition of the culvert and stream crossing downstream from the beaver ponds. Conditions at the culvert during each site visit will be documented in photographs and communicated to EPA

within 48 hours after each site visit. Should debris be observed at the culvert, EPA would be notified. Removal of the debris would be attempted by Atlantic Richfield in a timely manner, and/or when site conditions allow for safe access for personnel and equipment, as described in Section 4.

C. Communications

Results of periodic routine monitoring of site conditions shall be communicated to U.S. EPA via email to deschambault.lynda@epa.gov, Riley.Gary@epa.gov, and Shaffer.Caleb@epa.gov.

The list of contacts for pre-event monitoring is provided in Attachment 1.

3. Event Notification Procedures

The procedures by which personnel will be notified of an event are provided in Attachment 2.

4. POST EVENT: SHORT TERM RESPONSE (2 to 3 days)

A. Acid Drainage Storage Ponds Filled to Capacity

During the Past 15 years, no unauthorized discharges of acid drainage have occurred from the Leviathan Mine collection ponds. During three of these years (2005, 2006, and 2011) projections of the pond water elevations showed the likelihood for the ponds to spill to Leviathan Creek, but the Water Board was able to successfully mobilize a portable lime neutralization system to treat water removed from the ponds and discharge treated water in a controlled manner to prevent overflow of acidic drainage to Leviathan Creek. The treated water met discharge criteria established by EPA each year, except for minor and short term exceedances of standards for nickel, and aluminum.

This contingency remains in place and would again be implemented by the Water Board should projected water levels in the storage ponds indicate that an overflow of untreated acidic drainage is probable and as site conditions permit.

In the event that there is a release of water from the acid drainage storage ponds due to high rainfall, trained crew members (Water Board personnel) will be sent at the earliest and safest time to examine the site. The ponds will be examined for bank integrity and infrastructure integrity. Water samples will be collected from Stations 15 and 25 to evaluate if water quality parameters were negatively affected by the release.

B. Beaver Dam Failure

If evaluation of water quality and streamflow data at SW-15 and or Station 25 indicates that a beaver dam near Leviathan Mine may have failed, U.S. EPA will communicate that information to Atlantic Richfield.

Atlantic Richfield staff will inspect the condition of the culvert that conveys Leviathan Creek beneath Leviathan Mine Road, and of the road near the creek crossing during the next scheduled monthly site visit, and will provide a description of the observed conditions to U.S. EPA within 48 hours of completing the site visit. A plan of action to address potential culvert

maintenance, road repair, and/or establishing storm water pollution prevention best management practices (BMPs) for erosion control will be developed in conjunction with the U.S. Forest Service who owns the off property land and for road access.

5. POST EVENT: LONG TERM RESPONSE (more than 5 days)

A. Acid Drainage Storage Ponds Filled to Capacity

Long term monitoring by U.S. EPA personnel after a release of water from the acid drainage storage ponds would primarily entail tracking water quality properties collected remotely from the U.S. EPA data sondes at Station 15 and Station 25. (https://stormcentral.waterlog.com/public/usepar9)

B. Beaver Dam Failure

Long term monitoring after a beaver dam failure and subsequent erosional damage, if any, to the mine access road would include continuing inspections (by Atlantic Richfield personnel during approximately monthly site visits) of the culvert under the road to evaluate whether debris is obstructing the opening.

Atlantic Richfield will attempt to clear the culvert as necessary to keep the mine access road passable when site conditions allow for a safe working environment. In the event that debris accumulates at the culvert, it will be removed using appropriate heavy equipment, if necessary, when the site can be safely accessed. Weather conditions and the amount of snow present along the Nevada access route will influence when the site can be safely accessed and the culvert cleaned. High streamflow will limit when work can be conducted within and adjacent to the active stream channel. Unsafe conditions such as high streamflow, or the presence of snow and/or ice near the culvert would preclude removal of debris by hand and the mobilization of heavy equipment to the area.

The need for a response to repair damage to the mine access road, if any, resulting from failure of a beaver dam would be evaluated by Atlantic Richfield in coordination with the U.S. Forest Service. Per the road use permit FS-7700-41 signed in July 2013, the FS authorizes Atlantic Richfield Co. access to and use of the Leviathan Mine Road and a designated spur to the Aspen Seep to support its operations at the Leviathan Mine. This permit outlines terms and conditions for this use as well as operations detail, performance, and requirements for conducting maintenance on the road (including snow plowing). Routine maintenance and use is outlined in an annual operating plan approved by the FS. In the event of non-routine maintenance not covered in their annual operating plan for a given year, Atlantic Richfield will contact the FS representative (Ken Maas) and structure a plan to meet their needs. Together, the FS and Atlantic Richfield have achieved this objective in a timely fashion as needed during the past decade. The FS also agrees to participate in quarterly monitoring of the road conditions to the mine site, starting in the second quarter, FY 2016(road conditions allowing). The road monitoring results will be conveyed to the EPA project manager as soon as practicable after the inspection is completed.

If temporary stormwater best management practice (BMPs) are installed as part of a

temporary repair to the culvert or access road, Atlantic Richfield staff would monitor the integrity of BMPs and inspect the area for any indications of additional erosional damage. Atlantic Richfield will notify U.S. EPA regarding site conditions within 48 hours of completing each site visit.

6. Duties and Responsibilities for Contact and Monitoring

The procedures by which personnel will be notified of an event is provided in Attachment 2.